

Supplemental Preliminary Amendment

Page 2 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

specific first dimensions and said second abrasive composite has a second shape having second specific dimensions, wherein each of said abrasive composites has a boundary defined by at least four planar surfaces, wherein adjacent planar surfaces of one composite meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first abrasive composite is different from all of the angles of intersection of said second composite, said production tool comprising a structure having a plurality of adjacent three-dimensional cavities form on a major surface thereof, wherein each three-dimensional cavity is defined by a substantially distinct and discernible boundary which includes substantially specific dimensions, wherein a first three-dimensional cavity has a first shape having specific first dimensions and a second three-dimensional cavity has a second shape having second specific dimensions, wherein each of said three-dimensional cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one three-dimensional cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first three-dimensional cavity is different from all angles of intersection of said second three-dimensional cavity, wherein said three-dimensional cavities comprise pyramidal shapes, wherein each pyramidal shape comprises planar surfaces which intersect to form a material-included angle at a distal end of said pyramid, and wherein said material-included angle is a value from 25° to 90°.

19. (TWICE AMENDED) A production tool useful to shape an abrasive slurry into an array of three-dimensional nonidentical abrasive composites, said production tool manufactured by a method comprising:

(A) preparing a master tool, the method comprising:

(1) determining angles corresponding to facing right and left planar surfaces of adjacent three-dimensional shapes and wherein each of said angles has a value as measured between its planar surface and a plane which extends in a normal direction to said major surface and contains an edge of said planar surface in contact with said major surface, by the following substeps:

(i) selecting an angle value between, but not including, 0° and 90° to establish a first-right-half angle of a first-right planar surface of a first-right-side three-dimensional shape with a random number generating means capable of randomly selecting an angle value

Supplemental Preliminary Amendment

Page 3 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

between, but not including, 0° and 90° ;

(ii) selecting an angle value between, but not including, 0° and 90° with said random number generating means to establish a first left half angle for a first left planar surface of a first left-side three-dimensional shape facing said first right planar surface of said first right-side three-dimensional shape;

(iii) proceeding along a first direction extending linearly within said first imaginary plane to a second left planar surface of a second left-side three-dimensional shape located adjacent said first left-side three-dimensional shape and using said random number generating means to select a value between, but not including, 0° and 90° to establish a second left planar angle for said second left planar surface;

DA (iv) using said random number generating means to select a value between, but not including, 0° and 90° for a second right planar surface of a second right-side three-dimensional shape facing said second left planar surface;

(v) proceeding along said first direction to a third right-side three-dimensional shape located adjacent said second right-side three-dimensional shape;

(vi) repeating said substeps (i), (ii), (iii), (iv), and (v), in that sequence, at least once;

(2) repeating step (1) except that the angles are determined for left and right planar surfaces of adjacent three-dimensional shapes deployed in two adjacent rows in a second direction extending linearly within said first imaginary plane, wherein said first and second directions intersect;

(3) using means to determine, for a given width of said surface of said master tool, locations of grooves required to be cut by a cutting means to form a series of intersecting grooves defining a plurality of three-dimensional shapes having said angles calculated by steps (1) and (2); and

(4) providing a cutting means to cut grooves in said surface of said master tool in correspondence to said angles calculated by steps (1) and (2) and said groove locations determined by step (3) to form a series of intersecting grooves which define a plurality of three-dimensional shapes upraised from said surface, each of said shapes being defined by a distinct and discernible

Supplemental Preliminary Amendment

Page 4 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

boundary including specific dimensions, wherein not all said three-dimensional shapes are identical;
and

(B) forming the production tool using the master tool.

20. ~~(TWICE AMENDED) A production tool for manufacturing an abrasive article that~~
comprises a major surface having deployed in fixed position thereon first and second three-dimensional abrasive composites, each of said composites comprising abrasive particles dispersed in a binder and having a shape defined by a substantially distinct and discernible boundary which includes substantially specific dimensions, wherein said first abrasive composite has a shape having specific first dimensions and said second abrasive composite has a second shape having second specific dimensions, wherein each of said abrasive composites has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one composite meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first abrasive composite is different from all of the angles of intersection of said second composite, said production tool comprising a structure having a plurality of adjacent three-dimensional cavities form on a major surface thereof, wherein each three-dimensional cavity is defined by a substantially distinct and discernible boundary which includes substantially specific dimensions, wherein a first three-dimensional cavity has a first shape having specific first dimensions and a second three-dimensional cavity has a second shape having second specific dimensions, wherein each of said three-dimensional cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one three-dimensional cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first three-dimensional cavity is different from all angles of intersection of said second three-dimensional cavity, and wherein the production tool is a roll.

21. (TWICE AMENDED) A production tool for manufacturing an abrasive article that comprises a major surface having deployed in fixed position thereon first and second three-dimensional abrasive composites, each of said composites comprising abrasive particles dispersed in a binder and having a shape defined by a substantially distinct and discernible

Supplemental Preliminary Amendment

Page 5 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

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~~boundary which includes substantially specific dimensions, wherein said first abrasive composite has a shape having specific first dimensions and said second abrasive composite has a second shape having second specific dimensions, wherein each of said abrasive composites has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one composite meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first abrasive composite is different from all of the angles of intersection of said second composite, said production tool comprising a structure having a plurality of adjacent three-dimensional cavities form on a major surface thereof, wherein each three-dimensional cavity is defined by a substantially distinct and discernible boundary which includes substantially specific dimensions, wherein a first three-dimensional cavity has a first shape having specific first dimensions and a second three-dimensional cavity has a second shape having second specific dimensions, wherein each of said three-dimensional cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one three-dimensional cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first three-dimensional cavity is different from all angles of intersection of said second three-dimensional cavity, and wherein the production tool is a coating roll.~~

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25. ~~(AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.~~

26. (AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.

Supplemental Preliminary Amendment

Page 6 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

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27. ~~(AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.~~

33. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape and the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second plurality of angles, and wherein the production tool is a coating roll.

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34. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first and third plurality of angles, and wherein the production tool is a coating roll.

35. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least

Supplemental Preliminary Amendment

Page 7 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, wherein at least one of the angles of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles, and wherein the production tool is a coating roll.

36. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll.

37. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll.

38. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll.

39. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll.

40. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity,

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Supplemental Preliminary Amendment

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

Page 8 of 32

wherein at least two adjacent cavities have at least one dimension different between the two cavities, and wherein the production tool is a coating roll.

41. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first shape and a second group of cavities has a second, different, shape, and wherein the production tool is a coating roll.

42. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first size and a second group of cavities has a second, different, size, and wherein the production tool is a coating roll.

43. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defined by substantially distinct and discernible boundaries which include substantially specific dimensions, wherein a first cavity has specific first dimensions and a second cavity has specific second dimensions, each of said cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first cavity is different from all the angles of intersection of said second cavity, and wherein the production tool is a coating roll.

44. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape and the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second plurality of angles, and wherein the production tool is an engraved metal roll.

Supplemental Preliminary Amendment

Page 9 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

45. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first and third plurality of angles, and wherein the production tool is an engraved metal roll.

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46. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, wherein at least one of the angles of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles, and wherein the production tool is an engraved metal roll.

47. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

Supplemental Preliminary Amendment

Page 10 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

48. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

49. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

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50. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

51. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least two adjacent cavities have at least one dimension different between the two cavities, and wherein the production tool is an engraved metal roll.

52. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first shape and a second group of cavities has a second, different, shape, and wherein the production tool is an engraved metal roll.

53. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defining at least a first and a second group, wherein a first group of

Supplemental Preliminary Amendment

Page 11 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

cavities has a first size and a second group of cavities has a second, different, size, and wherein the production tool is an engraved metal roll.

54. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defined by substantially distinct and discernible boundaries which include substantially specific dimensions, wherein a first cavity has specific first dimensions and a second cavity has specific second dimensions, each of said cavities has a boundary defined by at least four planar surfaces, wherein adjacent planar surfaces of one cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first cavity is different from all the angles of intersection of said second cavity, and wherein the production tool is an engraved metal roll.

94. (AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair.

95. (AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair.

96. (AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair.

98. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a

Supplemental Preliminary Amendment

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

Page 12 of 32

first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape and the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths, and wherein the production tool is a coating roll.

99. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, and the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths, and wherein the production tool is a coating roll.

100. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape including a base and fourth plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of

Supplemental Preliminary Amendment

Page 13 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

the base edge lengths of the first, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths, and wherein the production tool is a coating roll.

101. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is a coating roll.

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102. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is a coating roll.

103. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is a coating roll.

104. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least two adjacent cavities have at least one base edge length different between the two cavities, and wherein the production tool is a coating roll.

105. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a

Supplemental Preliminary Amendment

Page 14 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape and the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths, and wherein the production tool is an engraved metal roll.

106. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, and the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths, and wherein the production tool is an engraved metal roll.

107. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape including a base and fourth plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of

Supplemental Preliminary Amendment

Page 15 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

the base edge lengths of the first, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths, and wherein the production tool is an engraved metal roll.

108. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

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109. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

110. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is an engraved metal roll.

111. (TWICE AMENDED) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least two adjacent cavities have at least one base edge length different between the two cavities, and wherein the production tool is an engraved metal roll.

Supplemental Preliminary Amendment

Page 16 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

133. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

134. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

135. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

136. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, and further wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

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Supplemental Preliminary Amendment

Page 17 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

137. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape and the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second plurality of angles, and wherein the production tool is a coating roll; and forming the production tool using the design.

138. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first and third plurality of angles, and wherein the production tool is a coating roll; and forming the production tool using the design.

139. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least

D7
Sub 87

Supplemental Preliminary Amendment

Page 18 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, wherein at least one of the angles of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles, and wherein the production tool is a coating roll; and
forming the production tool using the design.

140. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll; and
forming the production tool using the design.

141. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll; and
forming the production tool using the design.

142. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll; and
forming the production tool using the design.

143. (NEW) A method of making a production tool, the method comprising:

Supplemental Preliminary Amendment

Page 19 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is a coating roll; and forming the production tool using the design.

144. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least two adjacent cavities have at least one dimension different between the two cavities, and wherein the production tool is a coating roll; and forming the production tool using the design.

145. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first shape and a second group of cavities has a second, different, shape, and wherein the production tool is a coating roll; and forming the production tool using the design.

146. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first size and a second group of cavities has a second, different, size, and wherein the production tool is a coating roll; and forming the production tool using the design.

147. (NEW) A method of making a production tool, the method comprising:

Supplemental Preliminary Amendment

Page 20 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defined by substantially distinct and discernible boundaries which include substantially specific dimensions, wherein a first cavity has specific first dimensions and a second cavity has specific second dimensions, each of said cavities has a boundary defined by at least four planar surfaces, wherein adjacent planar surfaces of one cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first cavity is different from all the angles of intersection of said second cavity, and wherein the production tool is a coating roll; and

forming the production tool using the design.

148. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape and the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second plurality of angles, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

149. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first and third plurality of

D7
Sub E87

Supplemental Preliminary Amendment

Page 21 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

angles, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

150. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the angles of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, wherein at least one of the angles of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

151. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

152. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production

D7
Sub E87

Supplemental Preliminary Amendment

Page 22 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

153. (NEW) A method of making a production tool, the method comprising:
creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

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154. (NEW) A method of making a production tool, the method comprising:
creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

155. (NEW) A method of making a production tool, the method comprising:
creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least two adjacent cavities have at least one dimension different between the two cavities, and wherein the production tool is an engraved metal roll; and forming the production tool using the design.

156. (NEW) A method of making a production tool, the method comprising:

Supplemental Preliminary Amendment

Page 23 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first shape and a second group of cavities has a second, different, shape, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

157. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first size and a second group of cavities has a second, different, size, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

158. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defined by substantially distinct and discernible boundaries which include substantially specific dimensions, wherein a first cavity has specific first dimensions and a second cavity has specific second dimensions, each of said cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first cavity is different from all the angles of intersection of said second cavity, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

159. (NEW) A methods of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair; and

DT
Sub E87

Supplemental Preliminary Amendment

Page 24 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

forming the production tool using the design.

160. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair; and

forming the production tool using the design.

161. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, and wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair; and

forming the production tool using the design.

162. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape and the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths, and wherein the production tool is a coating roll; and

forming the production tool using the design.

163. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production

Def
Sub E 8

Supplemental Preliminary Amendment

Page 25 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, and the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths, and wherein the production tool is a coating roll; and forming the production tool using the design.

164. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape including a base and fourth plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first, third, and fourth plurality of base edge lengths, and wherein at least one of the base edge lengths of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths, and wherein the production tool is a coating roll; and

forming the production tool using the design.

Supplemental Preliminary Amendment

Page 26 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

165. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is a coating roll; and

forming the production tool using the design.

166. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is a coating roll; and

forming the production tool using the design.

167. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is a coating roll; and

forming the production tool using the design.

168. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least two adjacent cavities have at least one

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Supplemental Preliminary Amendment

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

Page 27 of 32

base edge length different between the two cavities, and wherein the production tool is a coating roll;
and

forming the production tool using the design.

169. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape and the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second plurality of base edge lengths, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

170. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, and the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second and third plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first and third plurality of base edge lengths, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

D7
Sub E87

Supplemental Preliminary Amendment

Page 28 of 32

Serial No.: 09/520.032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

171. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape including a base and first plurality of base edge lengths forming the base of the geometric shape, the second plurality of cavities each have a second geometric shape including a base and second plurality of base edge lengths forming the base of the geometric shape, the third plurality of cavities each have a third geometric shape including a base and third plurality of base edge lengths forming the base of the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape including a base and fourth plurality of base edge lengths forming the base of the geometric shape, wherein at least one of the base edge lengths of the first plurality is different from all of the base edge lengths of the second, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the second plurality is different from all of the base edge lengths of the first, third, and fourth plurality of base edge lengths, wherein at least one of the base edge lengths of the third plurality is different from all of the base edge lengths of the first, second, and fourth plurality of base edge lengths, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

172. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 10% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

173. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production

DA
Sub E87

Supplemental Preliminary Amendment

Page 29 of 32

Serial No.: 09/520,032

Filed: 6 March 2000

For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 30% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

174. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least 50% of pairs of adjacent cavities have at least one base edge length different between the two cavities of the pair, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

175. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, the dimensions including base edge lengths, wherein at least two adjacent cavities have at least one base edge length different between the two cavities, and wherein the production tool is an engraved metal roll; and

forming the production tool using the design.

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